WHAT IS CLAIMED IS:

1. A method for IEEE-rounding a computed quotient in a processor, the computed quotient corresponding to an exact quotient which equals a dividend divided by a divisor, the method comprising:

(a) determining an error range of the exact quotient;

(b) determining a first candidate number and a second candidate number from the error range;

(c) associating the first candidate number with a first rounding interval containing numbers that are IEEE-rounded to the first candidate number;

(d) associating the second candidate number with a second rounding interval containing numbers that are IEEE-rounded to the second candidate number;

(e) computing the dewpoint number, which separates the first rounding interval from the second rounding interval;

(f) back-multiplying the dewpoint number by multiplying the dewpoint number by the divisor; and

(g) comparing the back-multiplied dewpoint number against the dividend to determine whether the first candidate number represents the IEEE-rounded computed quotient, or whether the second candidate number represents the IEEE-rounded computed quotient.

2. The method as recited in claim 1, wherein computing the dewpoint number comprises:

(h) adding a rounding injection to the computed quotient;

(i) truncating the computed quotient;

(j) determining a dewpoint displacement constant; and

(k) adding the dewpoint displacement constant to the truncated computed quotient.

3. The method as recited in claim 1, wherein comparing the back-multiplied dewpoint number against the exact quotient comprises:

(h) subtracting the dividend from the back-multiplied dewpoint number to compute a difference; and

(i) utilizing only a subset of the least-significant bits of the difference to determine whether the difference is zero, and, if the difference is not zero, determining whether the difference is positive or negative.

4. An apparatus for performing the method as recited in claim 3, comprising a half-size multiplier to perform back-multiplying the dewpoint number.

5. A method for determining the Booth recoding of a correction term for a dewpoint number as recited in claim 1, given a digit position i the method comprising:

(h) computing a first Booth recoded operand of the correction term modulo 2^{-i};

(i) computing a second Booth recoded operand equal to the first Booth recoded operand minus 2^{-i};

(j) computing a signal indicating whether the first Booth recoded operand represents the correction term plus 2^{-i}; and

(k) choosing, if the signal is zero, the first Booth recoded operand to represent the correction constant, and choosing the second Booth recoded operand to represent the correction constant otherwise.

6. A Booth multiplier for computing the product of a first operand and a second operand, comprising:

(a) a first stage operative to preparing the first operand and the second operand for the addition of partial products, and operative to recoding the second operand in Booth radix-8 digits, and operative to generating partial products;

(b) a second stage having an adder tree operative to compressing the partial products; and

(c) a third stage having an adder operative to compressing the carry-save representation of the product to a binary representation.